



TOWN OF GRAFTON
GRAFTON MEMORIAL MUNICIPAL CENTER
30 PROVIDENCE ROAD

GRAFTON, MASSACHUSETTS 01519
(508) 839-5335 ext 1100 • FAX (508) 839-4602

www.grafton-ma.gov

**SELECT BOARD
MEETING AGENDA**

August 20, 2019

Municipal Center, Conference Room A
7:00 p.m.

AMENDED (August 19, 2019)

For a copy of the complete agenda packet visit <https://www.grafton-ma.gov/select-board/pages/select-board-meeting-packets>

CALL TO ORDER

ANNOUNCEMENTS

1. SCHEDULE - Eastern Equine Encephalitis (EEE) Discussion & MRC Update

- a) DPW Update, Andy Deschenes – Budget Resolution
- b) Fire Study Committee Update

2. RESIGNATIONS

- a) Election Workers

3. APPOINTMENTS

Select Board

- a) Name Select Board Representative on the following: DPW Building Committee & Affordable Housing Trust
- b) Board of Registrar – Carl Parisi
- c) Special Counsel for Planning Board - Miyares-Harrington

Town Administrator - None

4. NEW BUSINESS

- a) Historic District Commission – Common Brick Pavers
- b) Blue Wave Pilot Agreement 43 Estabrook Ave (BWC Lake Ripple LLC)
- c) Call Special Election for Select Board Member

5. SELECT BOARD REPORTS / TA REPORTS

6. CORRESPONDENCE

7. DISCUSSION

- a) Revenue & Expense Projections
- b) Long Term Tree Account

8. MEETING MINUTES

EXECUTIVE SESSION

MGL Chapter 30A, Sec. 21(3)
Litigation Update
Litigation Strategy
Union Negotiations
Land Negotiation
Non Union Negotiations
Strategy for Negotiations
Minutes

ADJOURN

1 (a) SCHEDULE DPW UPDATE – BUDGET RESOLUTION

Andy Deschenes, OPM and Rebecca Meekins, Assistant Town Administrator will discuss with the Select Board, budget resolution options relative to the DPW Building Project.

MOTION (s):

No formal Select Board vote necessary.



OFFICE OF THE
TOWN ADMINISTRATOR

30 Providence Road
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(508) 839-5335

Town Administrator: *Timothy P. McInerney*
mcinerneyt@grafton-ma.gov
www.grafton-ma.gov

TO: Selectboard

DATE: August 14, 2019

RE: DPW Project Budget Resolution Options

The DPW Building Project is currently facing a shortfall of approximately \$1 million. When the project was initially approved, it was approved with a smaller than typical contingency (approximately 3% rather than 10%). The actual contingency was \$327,907. The project was bid out with several alternates to enable it to go forward by breaking out some items if the bids came in over budget. We were able to include the first two alternates (salt shed, and full building size) but not others. Alternate #3 included all the equipment in the building, valued at approximately \$500,000.

As you are aware, the project hit a significant amount of underground ledge – unforeseen conditions – that had not been previously identified. The cost of the change order to address that ledge was \$407,000. After learning of this cost, the team engaged in a value engineering session to reduce project costs elsewhere to attempt to regain some of the lost contingency. Those savings amounted to approximately \$300,000. Initially, the plan has been to purchase the equipment in Alternate #3 with project savings and to shift some costs (like paving) to another funding source (Highway Stabilization). The ledge change order eliminated our ability to apply savings towards equipment, and it was determined that the stabilization funds could not be used towards the paving of the site.

Additionally, and not directly related to the DPW project, the existing (single-walled, underground) gas pump at the former Police Station was determined to be at the end of its functional life and would need to be replaced by the end of 2020. Fortunately, the DPW facility was designed to accommodate a future gas pump next to the new diesel pump. Instead of “in the future”, it now makes sense to purchase and install this gas pump while the DPW project is under construction for the sake of efficiency and cost effectiveness. For these reasons, the DPW Building Project is seeking funding for:

- Equipment included in Alternate #3: \$500,000
- Funds for the paving of the site: \$170,000
- Funding to remove and install gas pumps: \$220,000

We have put together a few different funding options and scenarios for the Board to consider.

ram/TPM

The first option, and the recommended option, would be to submit to the Department of Revenue for a DE-2, which allows a town to borrow in excess of what was approved for a debt exclusion, up to a certain amount. Typically, that ceiling is 10%. The \$1 million would amount to 8% of the total initial approval of \$12,700,000. We have reached out to the DOR and they have indicated that it would likely be approved. This additional \$1 million of debt service needs to be approved by town meeting and will cost the average taxpayer between \$.02 and \$.04 cents on the tax rate, or on average, \$10 per year. Other factors that could alter this figure are interest rates (we carry 4.5% which is a very conservative number) and home values. If home values increase, the impact of debt on the taxpayer should go down.

A second option would be for the town to fund the \$1 million borrowing inside the tax levy. This would mean reducing operations by approximately \$100,000 per year over the next 20 years to pay that debt service.

Another option would be to use a combination of free cash and road stabilization funds. Town meeting can determine if they wish to use road stabilization funds for a purpose other than the roads program. It is a stabilization account, so it would take 2/3 vote to secure funds for the purpose of funding the DPW Building Project. We would propose using \$500,000 from free cash, and \$500,000 from the road stabilization account, to be borrowed with BANs and paid back in November of 2020. This option would have an impact on the number of roads paved in the FY20 paving season.

The final option would be to use the town's general Stabilization Account, which currently has about \$3.6 million. This would take a 2/3 vote of town meeting. There are many different combinations of funding that could be proposed between free cash, stabilization and road stabilization.

We recommend that the Board move forward with option one, the DE-2.

1 (b) SCHEDULE: FIRE STUDY COMMITTEE UPDATE

Members of the Fire Study Committee will be present to give an update on their progress.

2 (a) RESIGNATIONS: ELECTION WORKERS

Kandy Lavallee, Town Clerk would like the Select Board to accept her request to have the following election worker removed from her list of active members; Thomas Pond, Sharon Ward and Jane Baraban.

MOTION

I move the Board vote to remove the following election workers from the Town Clerk's list of active members; Thomas Pond, Sharon Ward and Jane Baraban as election workers.



TOWN CLERK

Kandy L. Lavallee
Town Clerk

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GRAFTON, MASSACHUSETTS 01519
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email: clerks@grafton-ma.gov



August 14, 2019

Select Board
30 Providence Road
Grafton, MA 01519

Dear Select Board,

Please accept this letter as a request to remove the following individuals as Election Workers for the Town of Grafton:

Thomas Pond
63 North Street
Grafton, MA 01519

Sharon Ward
53 Brookmeadow Lane
South Grafton, MA 01560

Jane Baraban
47 Elliot Trail
Grafton, MA 01519

Thank you,

Kandy L. Lavallee
Town Clerk

3. APPOINTMENTS (BOS): SELECT BOARD REPRESENTATION

DPW BUILDING COMMITTEE

AFFORDABLE HOUSING TRUST SELECTBOARD REPRESENTATION

With the recent resignation of Bruce Spinney as a member of the Select Board, the Board is asked to designate one member as their representative on the Affordable Housing Trust and one member on the DPW Building Committee.

MOTION #1

I move the Board vote to appoint _____ as the Select Board Representative on the Affordable Housing Trust Committee.

MOTION #2

I move the Board vote to appoint _____ as the Select Board Representative on the DPW Building Committee.

3(b) APPOINTMENTS (BOS): REGISTRAR OF VOTERS

Carl Parisi recently submitted a citizen's activity form noting his interest in serving as a Registrar of Voters. Kandy Lavallee, Town Clerk reached out to Mr. Parisi and after discussing the responsibilities, she feels he will be a good fit.

MOTION:

I move the board vote to appoint Carl Parisi as Registrar of Voters for the Town of Grafton.



Grafton, MA

30 Providence Road

Phone: 508-839-5335

Citizen Activity Form

Good Government Starts with You

Date Submitted: August 15, 2019

Name: Carl M Parisi

Home Address: 101 Old Westboro Rd
NORTH GRAFTON, MA 01536

Mailing Address: 101 Old Westboro Rd
NORTH GRAFTON, MA 01536

Phone Number(s): (508)-839-3419 - Home

Email Address: camapa3@yahoo.com

Current Occupation/Employer: Senior Purchasing agent for Nova Biomedical

Narrative: I am a Registered Democrat

Hold an MS from NEU Boston

Available after work hours

Interest in serving on the Board of Registrars of Voters Commission 3years term

Best way to reach me at this time is via email

Board(s) / Committee(s): BOARD OF REGISTRARS OF VOTERS



TOWN CLERK

Kandy L. Lavallee
Town Clerk

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August 16, 2019

Select Board
30 Providence Road
Grafton, MA 01519

Dear Select Board,

I would like to recommend the appointment of the following individual as a Board of Registrar (Democrat) for the Town of Grafton:

Carl M. Parisi
101 Old Westboro Road
North Grafton, MA 01536

Thank you,

Kandy L. Lavallee
Town Clerk

3(c) APPOINTMENTS (BOS): SPECIAL COUNSEL FOR PLANNING BOARD
– Miyares-Harrington

The Planning Board is requesting legal assistance for their review of the cell tower application submitted by Crown Castle at 84 Snow Road (rear). Therefore they are asking that the Select Board vote to appoint Miyares-Harrington as Special Counsel for the Planning Board.

MOTION:

I move the board vote to appoint Miyares-Harrington as Special Counsel to the Planning Board.




**PLANNING
DEPARTMENT**

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MEMORANDUM

TO: Timothy McInerney, Town Administrator

FROM: Joseph Laydon, Town Planner 

DATE: August 19, 2019

SUBJECT: Request to Engage Special Counsel to Assist Planning Board

The Planning Board has requested legal assistance for their review of the cell tower application, submitted by Crown Castle at 84 Snow Road Rear, that is currently before the Board.

The following are the facts of the case:

1. Application is for a replacement tower for the existing one at 20 Indian Path, close proximity to existing tower.
2. 20 Indian Path was recently purchased by a third-party holding company holds the land lease the tower is installed on.
3. Applicant states the third party introduces uncertainty and is claiming this is an economic hardship.
4. Applicant has not provided supportive information that there is a hardship for the carriers.
5. American Tower, owner of the lease that 20 Indian Path has submitted a letter stating that Crown Castle has not negotiated with them the new terms of the lease and objects to the proceedings.
6. Applicant's existing Lease expires Sept 2020.

The Board is requesting assistance from counsel on how to proceed on the following:

1. What information can the Board require for supporting economic hardship, Board was told that new FCC Guidance was published beginning of 2019 regarding economic hardship?
2. How does the Board condition a decision to only allow one tower to be constructed in the area?
3. Does past decisions permit the 20 Indian Path lease holder (American Tower) to construct a replacement tower since they Board's approvals were with individual cell companies not specifically with Crown Castle?

Since Town Counsel has recommended seeking assistance of a specialist, I am requesting on behalf of the Board that the Town retain the services of special counsel to assist the Planning Board. Any decision on this application will likely be challenged and the Board deems legal counsel's assistance as necessary. I have contacted Christopher Heep of Miyares-Harrington and he has agreed to provide assistance. He requests that the Town give approval to retain his firm as special counsel. While we will make an effort to request funds be submitted under 53G by the Applicant to cover this work, it is important for us to first approve the appointment as special counsel.

Please let me know if you have any questions about this request.

**4 (a) NEW BUSINESS: HISTORICAL DISTRICT COMMISSION – Grafton
Common Brick Pavers**

Members of the Grafton Historical District Commission will be present to provide information relative to the choice of brick as part of the Town Common Improvements.

MOTION:

No formal vote necessary



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Grafton Historic District Commission

August 15, 2019

Select Board Members:

We are writing to provide pertinent clarifying information relative to the choice of brick as part of the upcoming improvements to historic Grafton Common as approved at the May Town Meeting.

- Brick meets existing Americans with Disabilities Act (ADA) and Architectural Access Board (AAB) requirements for surface materials i.e. "stable firm and slip resistant". It is important to note that neither set of guidelines actually references any specific material; they instead focus on the conditions to be met by the material chosen.
- Updates to MA 521CMR are currently being proposed by the AAB that do include specifications relative to the use of "pavers, paving stones and bricks". These updates focus on the flatness and slip resistant qualities required of the material used, as well as the manner in which it must be installed in order to achieve compliance. This includes laying the pavers/bricks in the direction of travel in order to reduce vibrations.
 - These more stringent standards are what we will follow for this project.
- As with any material choice, installation by an experienced contractor is required to ensure adherence to ADA and AAB guidelines.
 - This will be stipulated in the invitation for bids for this project.
 - Work will be overseen by this Commission and the Town's project manager, Andy Deschenes. It will also be subject to approval of the building inspector to ensure all applicable requirements are satisfied.
- With proper installation, brick is low maintenance and will require little if any extra care to remain ADA/AAB-compliant for years to come.
 - Other materials require ongoing routine maintenance to either maintain ADA/AAB compliance and/or retain their appearance over time.
 - Please refer to the attached documents *The Case for Brick* and *Accessible Clay Brick Pavements* for additional details.

The Historic District Commission is committed to addressing existing accessibility issues within the Common as were noted in the Town's recently completed *ADA Self-Evaluation and Transition Plan*; this project is a big step in that direction. We look forward to working closely with the town's newly formed Commission on Disability to ensure that Grafton Common can be fully enjoyed by everyone for many years to come.

Sincerely,

Bill Nicholson, John Morgan, Paul Scarlett, John Stephens and Brad Schlapak

References:

- **Current MA 521 CMR**
 - <https://www.mass.gov/law-library/521-cmr>
- **Proposed Updates to MA 521 CMR**
 - <https://www.mass.gov/files/documents/2018/02/16/Proposed%20Changes%202006-15%20-%20FINAL%20DRAFT%20%28022916%29%20-%20Clean.pdf>
- **ADA Website**
 - <https://www.ada.gov/>

Accessible Clay Brick Pavements

Abstract: Pavements composed of clay brick pavers must be able to accommodate many types of traffic, including pedestrians with physical disabilities. This *Technical Note* includes guidance related to the design, construction and maintenance of pavements constructed of brick pavers that will serve all people, including those with disabilities.

Key Words: accessible surfaces, accessibility, ADA, disabilities, pavements, segmental pavements, sidewalks.

SUMMARY OF RECOMMENDATIONS:

Design

- Select a paving system that is durable and is easy to maintain and repair
- Ensure that the base is designed and constructed properly to avoid differential settlement
- Minimize joint and chamfer widths to control vibration experienced by wheeled devices (see Figure 2)
- Select appropriate trees and plants for locations near brick pavements, and employ root barriers or other best management practices to accommodate them
- Consider permeable pavements that allow more rapid water runoff and allow air and water to reach tree roots
- Minimize curb cuts in accessible paths to provide more level surfaces
- Use truncated dome pavers/detectable warning surfaces where applicable
- Select bond pattern and orientation that minimizes wheelchair vibration

Paver Selection

- Select pavers that have top surfaces and edges that are planar
- When present, chamfers or rounded edges not wider than ¼ in. (6 mm) are recommended

- Select pavers with a surface that will provide adequate slip resistance when wet

Construction

- Construct pavements with smooth and level surfaces within the specified tolerances:
 - ±¾ in. (10 mm) from level in 10 ft (3 m), noncumulative
 - ¼ in. (3.2 mm) maximum vertical lippage for straight edged pavers; ½ in. (6 mm) maximum vertical lippage for chamfered pavers
 - Maximum width of sand-filled joints: ⅜ in. (4.8 mm)
 - Maximum width of mortar-filled joints: ½ in. (13 mm)

Maintenance

- Inspect and maintain pavements on a regular basis, but not less than once a year
- Refill sand in the joints in sand-set brick paving assemblies when necessary
- Remove snow and ice as quickly as possible using appropriate tools or machines
- Repair pavements that inhibit accessibility as soon as practical

INTRODUCTION

Clay pavers have been used in streets, sidewalks, paths and plazas for hundreds of years. They are chosen for their durability, long-lasting color, small scale, and ability to blend in with the surrounding area. While these are all desirable traits, more recent awareness of the needs of people with disabilities has refocused attention on other attributes of paving surfaces (Photo 1). People with disabilities make up a significant percentage of the population in the United States. People with limited mobility include those in wheelchairs or using crutches or other walking aids, as well as individuals who are blind or have low vision. With the enactment of the Americans with Disabilities Act in 1990, and the subsequent publication of guidelines by the U.S. Access Board, requirements for accessible surfaces have been established. Research and prolonged use has documented that segmental



Photo courtesy Stiles & Hart Brick Company

Photo 1

Tammy Lynn Center for Developmental
Disabilities, Raleigh, North Carolina

clay paving systems can comply with provisions found within various accessibility guidelines. This *Technical Note* describes the ways that clay brick pavements can conform to accessibility requirements and be used as accessible routes.

While the information in this *Technical Note* is correct at the time of this writing, various updates to federal regulations are ongoing, so original sources should be checked for the most up-to-date information. In addition, there are various other requirements in the 2010 ADA Standards for Accessible Design (ADA Standards) [Ref. 1] that are not addressed here that could potentially impact the provisions covered in this *Technical Note*. This *Technical Note* should not be the only source used when designing an accessible pavement.

Misinformation about Clay Brick Pavements and Accessibility

It is important to maintain the proper perspective when evaluating existing brick paving systems that were designed and constructed prior to the advent of or without regard to ADA Standards. Such pavements were never intended to perform as accessible pavements. This is true for all pavement categories, including segmental, monolithic and other paving systems. Obviously, whether accessible or not, older paving systems should undergo maintenance or repairs to ensure that they meet both old and new performance requirements. Older pavements that have not received proper maintenance should not be expected to meet accessibility requirements.

Pavements using segmental pavers behave differently from monolithic slabs of concrete or other materials. It is often erroneously assumed that monolithic slabs are superior to segmental paver pavements because they have fewer joints; however, research shows that both types of pavements can be smooth enough to achieve accessibility requirements. In fact, the amount of work required for wheelchair users to cross segmental pavements may be less than for other pavement types [Refs. 2 and 6]. A frequent criticism of segmental pavements is that they have too many joints, which result in more vibrations to wheelchair users; however, vibration measurements conclude that the narrow joints in segmental pavements result in less severe vibrations than control joints in concrete slabs. Certainly larger joints, or pavers with large chamfers, can create a more irregular surface, but limiting chamfer size or joint size will result in the desired performance.

There is also a misconception that pavers normally become loose or misaligned over time, creating a tripping hazard. Pavers around street trees can become uneven over time due to growing roots forcing the pavers upward. This can be minimized with appropriate selection of plants or trees, root control and maintenance. Often, a segmental pavement will provide smoother surface transitions than the more abrupt changes in level that occur in monolithic concrete because the frequency of joints results in smaller incremental changes between pavers (compare Photo 2 and Photo 3). Pavements constructed with segmental pavers are much easier to repair than poured concrete, resulting in simpler and less costly maintenance.



Photo 2

Abrupt Changes in Level Caused by Tree Roots



Photo 3

Smoother Transition with Segmental Units

Research on Accessibility of Pavements Made with Clay Pavers

The clay and concrete paver industries, along with various federal agencies, funded a series of research projects [Refs. 2 and 6] to determine the effects of pavements constructed with pavers on people with disabilities. The research was conducted at the University of Pittsburgh and led by Dr. Rory A. Cooper, Director of the Human Engineering Research Laboratory. The research attempted to determine criteria for defining a pedestrian access route that does not require excessive propulsive work for people using wheelchairs, nor expose them to potentially harmful vibrations (Photo 4). While propelling a wheelchair, users encounter obstacles such as bumps, curb descents, and uneven surfaces. These obstacles cause vibrations on the wheelchair and, in turn, the wheelchair user, which through extended exposure can cause low-back pain, disc degeneration and other harmful effects to the body. Various paver designs were tested, including pavers with small chamfers, large chamfers and no chamfers. Two different bond patterns were also used as a variable. The following statement from the research [Ref. 6] summarizes the conclusions of the study:

"Based on the manual and power wheelchair results of this study, use of selected...pavers would be acceptable for any route traveled by individuals using wheelchair[s]. The results are as good as, and in some cases better, than that of a standard sidewalk surface. A [chamfer width] less than or equal to 6mm [0.24 in.] must be used for routes used by individuals using wheelchairs. Furthermore, a 90 degree herringbone pattern is preferred over the 45 degree pattern, while the 90 degree herringbone pattern is required for the 6mm [0.24 in.] [chamfered] pavers to maintain safe levels of vibration exposure."



Photo 4
University of Pittsburgh Research

Pavers having chamfers not greater than $\frac{1}{4}$ in. (6 mm) wide allow the front wheel (5 in. [126 mm] diameter or larger) of a wheelchair to span the distance between the top surfaces of the pavers without creating undue stress on the wheelchair user. The joints created by pavers with chamfers larger than this may cause discomfort. This information can be used to distinguish pavements designed for accessibility from those that are not. Current research is under way to develop a rollability index similar to that used for roadways. This index will assist in measuring the roughness of a surface.

CHARACTERISTICS OF ACCESSIBLE PAVEMENTS

The ADA Standards establish minimum design requirements for public and private buildings and facilities that promote access for people with disabilities. The U.S. Access Board is also developing guidelines that cover disability access provisions for pedestrian areas along public rights-of-way. These Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) [Ref. 4], when published as a final rule, are anticipated to become the basis of enforceable standards issued by governmental agencies.

The ADA Standards and PROWAG mandate several surface profile requirements applicable to all pavement systems. The designer should be aware of maximum permissible gradients and other requirements that often are overlooked when focusing on pavement surface requirements.

In addition to planning and designing in accordance with these guidelines, all pavement types need regular maintenance programs capable of preserving the safe and serviceable condition of these routes. Specific requirements especially pertinent to clay pavers relate to surface properties, changes in level, joints and detectable warning surfaces.

Surface

The ADA Standards and PROWAG require an accessible surface to be firm, stable and slip resistant (see Photo 5). Smoothness of the entire pavement also may be an important criterion, because disabled pedestrians and wheelchair users may be more sensitive to trip hazards and vibrations. Properly designed, installed and maintained clay paver surfaces achieve the required smoothness. Even when properly designed, installed and maintained, all pavement systems may be subject to heaving and settlement of underlying soils that result in changes in level. Research has shown that the vibration on clay paver surfaces is comparable to or less than that of poured concrete and other common paving materials [Refs. 2 and 6]. Simple maintenance should be conducted on these surfaces to maintain their smoothness.

Changes in Level and Paver Lippage

Both the ADA Standards and PROWAG allow a change in level (surface discontinuity) up to $\frac{1}{4}$ in. (6 mm) (see Figure 1a) to be untreated. Each also permits a maximum change in level of $\frac{1}{2}$ in. (13 mm) maximum, but the ADA Standards require this change in level to be sloped (beveled) not steeper than 1:2 (see Figure 1b). The PROWAG also requires a maximum slope (bevel) of 1:2 for this change in level but further mandates that the slope (bevel) be applied across the entire change in level (see Figure 1c).

With respect to pavers, changes in level (differences in elevation of the top surfaces of adjacent pavers) should be kept to a minimum through careful design and installation and should be maintained as part of a regular maintenance program. Changes in level can result from heaving or settling of the pavement base and more frequently occur at features that penetrate the paver layer, such as metal utility box frames and utility hole covers.

Joints

The ADA Standards do not specifically cover joint widths, but it does have requirements for openings in gratings, which should be considered due to their similarity. The PROWAG and ADA Standards include requirements for horizontal openings in walkway joints and gratings. Both documents state that openings in ground surfaces may not allow passage of a sphere more than $\frac{1}{2}$ in. (13 mm) wide. Such an opening would be more than twice the typical width of joints between pavers in pavements with sand and bituminous setting beds that are typically $\frac{1}{16}$ in. (1.6 mm) to $\frac{3}{16}$ in. (4.8 mm) wide (Photo 6). Joints in



Photo 5
At-Grade Street Crossing with ADA-Compliant
Surface Texture Changes

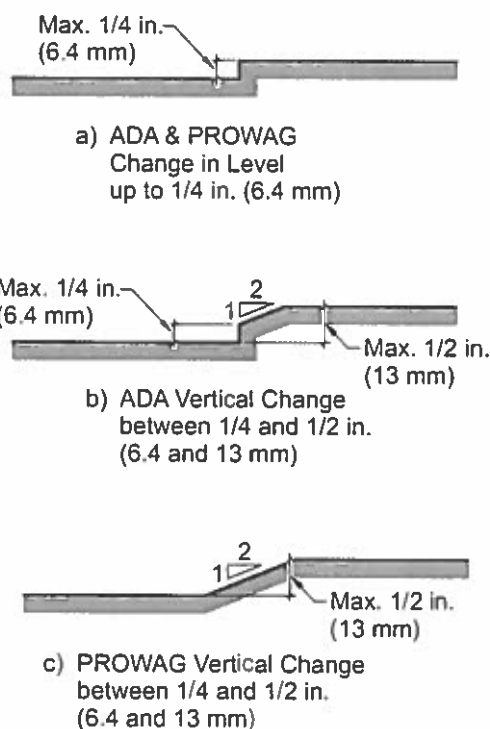


Figure 1
Requirements for Making Changes in Elevation

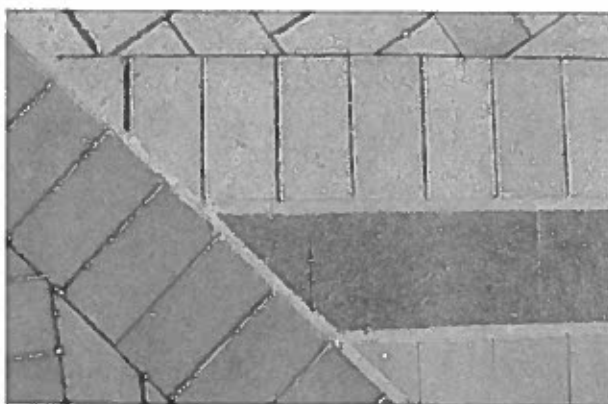


Photo 6
Typical Joint Size for Clay Pavers

permeable clay pavements are generally between ¼ in. (6 mm) and ⅜ in. (10 mm) wide. Joints between pavers in a mortar setting bed are generally ⅜ in. (9 mm) to ½ in. (13 mm) wide but are filled with mortar and thus are not generally considered openings.

Detectable Warning Surfaces

The PROWAG requires detectable warning surfaces between pedestrian and vehicular transitions. A detectable warning surface consists of a pattern of truncated domes sized to have a base diameter of at least 0.9 in. (23 mm) but not more than 1.4 in. (36 mm), a top diameter of a minimum of 50 percent to a maximum of 65 percent of the base diameter, and a height of 0.2 in. (5 mm). Clay pavers can be made with truncated domes in a variety of colors that conform to these requirements (Photo 7).

The ADA Standards require truncated domes to be placed on a square grid with a center-to-center spacing between 1.6 in. (41 mm) and 2.4 in. (61 mm), and a base-to-base spacing of 0.65 in. (17 mm) minimum, measured between the most adjacent domes. The PROWAG requires truncated domes to be placed in either a square or a radial grid pattern meeting the same dimensional layout requirements as set forth in the ADA Standards.



Photo courtesy Pine Hall Brick Company, Inc.

Photo 7
Detectable Warning Devices

The PROWAG also covers curb ramps and blended transitions, which are not covered in the ADA Standards. Curb ramps and blended transitions require detectable warning surfaces to extend 24 in. (610 mm) minimum in the direction of travel for their full width. Flares of curb ramps are not required to have a detectable warning surface. Both the ADA Standards and PROWAG require detectable warning surfaces to extend 24 in. (610 mm) from rail platform boarding edges. At pedestrian at-grade rail crossings, a detectable warning surface is required to be placed no less than 6 ft (1.8 m) and no more than 15 ft (4.6 m) from the centerline of the nearest rail. In addition, detectable warning surfaces are required to contrast visually with adjacent walking surfaces by using either light-on-dark or dark-on-light colors.

SPECIFICATION OF ACCESSIBLE PAVEMENTS

Selection of Appropriate Paving System

While creating a clear and smooth route for individuals with mobility impairments is an important consideration when choosing a pavement system, performance and maintenance requirements must also be considered. Any brick paving system as shown in *Technical Note 14* can be used as an accessible walkway or surface, but special attention should be paid to the joints between the pavers and surface features such as uneven textures and larger chamfers, which may inhibit mobility.

Pavements designed as permeable pavements may have characteristics that appear to be in conflict with accessible pavements, since permeable pavements rely on larger joints to allow water to infiltrate the paving surface. In permeable pavements, void area is not the determinant to infiltration; rather it is the aggregate used between the pavers and the layers below that allows infiltration. Specific aggregates are used that can achieve optimal infiltration as well as joint filling. In addition, most clay pavers are manufactured with minimal chamfers, which have less impact on the overall joint width. Both accessible and permeable pavements can be achieved by following design requirements for each. As an alternative, a permeable pavement could be designed to surround an impermeable accessible pathway. Other *Technical Notes* in this series discuss permeable pavements.

Since maintenance of pavements occurs infrequently (or not at all), pavement designs that allow the surface to remain stable over its life should be considered. Often, pavements that are constructed with a sand setting bed



Photo courtesy Boral Brick, Inc.

Photo 8
Chamfered Pavers



Photo courtesy Glen-Gery Brick

Photo 9
Herringbone Pattern at the National Civil War Museum, Harrisburg, PA

are easier and less expensive to maintain. Those laid with mortar joints will require more maintenance due to the mortar having a shorter life span than the pavers. Since the base of the pavement has such a great effect on the stability of the pavement, it should be strong enough to resist infrequent overloading, prolonged saturation and/or severe freeze/thaw conditions. Refer to *Technical Note 14* for discussion on brick paving assembly characteristics.

Surface Texture and Coefficient of Friction

The paver surface should also be considered in the selection of materials. Most wire-cut, pressed and molded pavers will provide a surface that does not inhibit the mobility of people with disabilities. Pavers that are heavily textured, such as tumbled pavers, may not provide suitable surfaces due to the increase in vibration for wheelchair users. Surfaces with higher coefficients of friction and slip resistance are also desired. While no generally accepted guidelines for the slip resistance of all walking surfaces under all conditions exists, advisory information suggests a static slip resistance value of 0.6 on horizontal surfaces and 0.8 on ramps. Clay pavers commonly have slightly roughened surfaces, such as wire-cut or sanded surfaces, which provide the desired slip resistance without detrimentally affecting the accessibility of the pavement [Ref. 3].

Chamfers and Lugs. Many clay pavers have chamfers (bevels) on their top edges (Photo 8). Some clay pavers also have lugs (spacers) on their sides to create uniform joint widths. The main purpose of chamfers is to reduce chippage on pavers and avoid direct contact between the top edges of adjacent pavers. Chamfers also create an interesting visual pattern and may help channel water off of the pavement surface. While chamfers and lugs can be desirable features on clay pavers, as their size increases, there is often an increase in the vibration experienced by wheelchair users as they roll across them. If the chamfer on each paver is equal to or less than $\frac{1}{4}$ in. (6 mm), then the resulting vibration should fall within the guidelines determined by the research mentioned previously [Refs. 2 and 6]. Similarly, the width of lugs should be considered so that recommended joint widths for various paving systems are not exceeded.

Bond Pattern. The bond pattern in which pavers are laid also has an impact on the vibration of wheelchairs. Patterns that result in joint lines parallel to the direction of travel generate the fewest vibrations. If pavers are laid in a herringbone pattern, which is typical of sand-set brick pavers, then less vibration is produced by a 90-degree herringbone as compared with a 45-degree herringbone pattern (Photo 9). The same can be said of a running bond pattern where the longitudinal joints are aligned with the direction of travel (Photo 10). When pavers with



Photo courtesy General Shale, Inc.

Photo 10

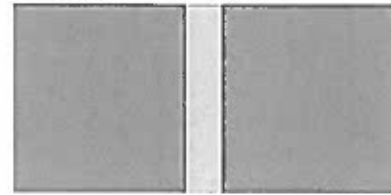
Stack Bond Pattern on Accessible Ramp

less than $\frac{1}{4}$ in. (6 mm) chamfers are used, research indicates that acceptable vibration levels are produced by any pattern.

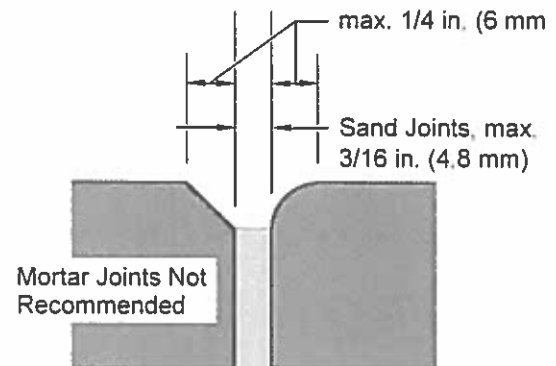
Joints. Joints serve an important function in a segmental pavement; however, each profile has unique issues to consider. A mortared brick pavement can serve as an acceptable surface, but the mortar joints should be specified to be cut flush or to have a very shallow profile. This creates a smoother or more even surface. This is preferable for drainage as well, since water will flow more quickly off of a pavement with shallower joints.

Flexible paving requires a small amount of sand in between the pavers. Sand joints should be as small as possible, but not so small that sand cannot be swept into the joints. An appropriate sand joint size is between $\frac{1}{8}$ in. (1.6 mm) and $\frac{3}{16}$ in. (4.8 mm) wide. Sand-set pavers, often erroneously called "hand-tight" paving, should not have pavers directly touch one another with no sand filling the joints. This does not allow pavement interlock and promotes chipping. However, gaps wider than $\frac{1}{2}$ in. (13 mm) may result in more noticeable vibration for the wheelchair user. Figure 2 shows appropriate paver joint configurations for accessible pavements. Although one wide joint in an entire field of brick paving may not be noticeable, joints that are consistently wider than recommended may result in an uneven surface due to shifting of pavers that have not developed sufficient interlock. Figure 3 provides a typical section of a pavement that can be used as an accessible pavement.

Mortar Joints, max. $\frac{1}{2}$ in. (13 mm) | Sand Joints, max. $\frac{3}{16}$ in. (4.8 mm)



a) Square-Edged Pavers



b) Chamfered or Rounded-Edge Pavers

Figure 2
Recommended Paver/Joint Configurations for Accessible Pavements

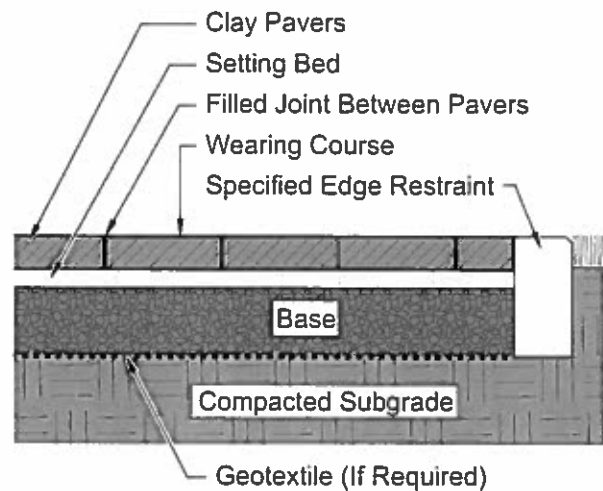


Figure 3
Typical Pavement Section

Street Trees and Utilities

Trees located within or along sidewalks provide many benefits to a community. While trees are a beautiful addition, their growth can create problems for the pavements surrounding them. In many cases, the roots of trees are what cause upheaval of a pavement (Photo 11). Tree roots can be cut back as they grow, but that harms the trees and may cause them to die.



Photo 11
Upheaval of Pavements Due to Tree Roots

First, consider specifying trees with less disruptive growth patterns beneath the surface, as well as above ground. Design or specify root barriers, or make the area surrounding the tree larger. Root barriers force the roots to grow down rather than spreading underneath the pavement. Not only do root barriers protect the surrounding pavement, but they also strengthen the tree by causing the roots to extend deeper into the soil. Larger soil areas allow the proper amount of water and air to reach the roots and allow the tree to grow into an area that is appropriate to its size. Various guides are available that provide design and implementation guidance for trees in urban areas, including preferred soil type around trees, size of tree grates and other information on coordinating these features with accessible routes [Ref. 5]. Permeable pavements are a potential alternative to tree grates, since they allow percolation yet can still function as an accessible path.

Below-grade service entrances, utility boxes, and other features that penetrate the surface can also disrupt a smooth brick pavement (Photo 12 and Photo 13). Two issues to consider are the change in level and the gap between the brick pavers and the metal box enclosing the unit. The same tolerances for installation of brick pavers as mentioned below can be used for these elements. Consideration should be given to utility units that have a transition or a beveled edge.

Curb Cuts

Curb cuts and driveway entrances create sidewalks that rise and fall along an accessible route (Photo 14). Keeping these to a minimum reduces tripping hazards and the amount of work required by wheelchair users. Design curb cuts with a longer transition or flared sides to avoid abrupt drops. The maximum slope ratio



Photo 12
Smooth Transition for Utility Structure



Photo 13
Abrupt Change in Level to Grate

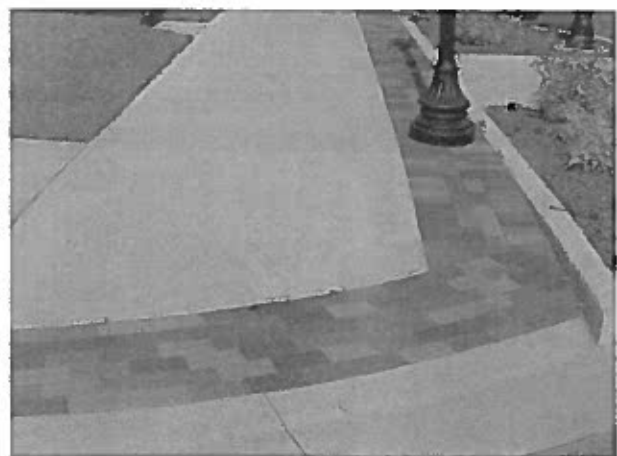


Photo courtesy Whitacre Greer Company
Photo 14
**Curb Cut and Pavers with Detectable
Warning Surfaces**

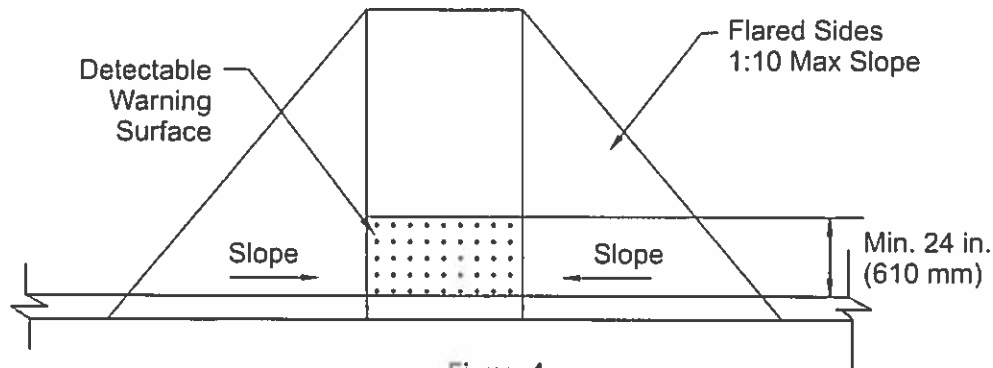


Figure 4

ADA Standards and PROWAG Requirements for Sides of Curb Ramps [Ref. 1]

of flared sides that complies with the ADA Standards and PROWAG is 1:10, as shown in Figure 4. Care must be used in planning the installation of pavers that transition between different elevations in a short distance to avoid unusual cuts or excess lippage between units. All tolerances for brick pavements apply at these locations as well. Curb cuts also require a detectable warning surface adjacent to the road. Brick pavers are available with the truncated domes that comply with the ADA Standards and PROWAG requirements. Consideration of materials that are permanent should take precedence over overlay materials that have a limited lifespan.

INSTALLATION REQUIREMENTS

Installation procedures can have an impact on the performance of the pavement. Pavements installed using recommended procedures will require less maintenance as the pavement ages. Information found in *Technical*



Photo 15
Excessive Lippage Between Pavers

Notes 14A, 14B and 14C for each of the pavement types will ensure that the minimum requirements are followed. The tolerances for pavements found in this *Technical Note* and others in this series conform to requirements found in the ADA Standards and other accessibility documents. Generally, the surface level of a pavement should not vary more than $\pm\frac{3}{8}$ in. (10 mm) within a 10 ft (3 m) measurement. Lippage between two pavers or a paver and the surrounding elements should be no more than $\frac{1}{8}$ in. (3 mm) for an accessible route (Photo 15). The maximum joint or gap between pavers or adjacent elements should be no more than $\frac{1}{2}$ in. (13 mm). A smaller difference in height between two pavers decreases the chance of a tripping hazard and allows for a smoother pavement. As the width of

joints increases, vibration generally becomes more severe, and pavers are more likely to shift, move or be lifted out of place.

When individual units are not placed within the tolerance requirements, they can be removed and replaced in a manner that brings them into compliance with project or code requirements. Pavers set in sand are more easily replaced than those set in mortar or on a bituminous setting bed.

MAINTENANCE REQUIREMENTS

All pavements should be inspected and maintained on a regular basis. Some owners, public and private, often ignore these recommendations, resulting in small or localized failures that become larger problems as time passes, requiring more costly repairs. Seasonal maintenance procedures, such as snow removal, may also require immediate attention.

Maintenance

Inspection of paving surfaces should be conducted on a regular basis, but at least yearly. For public streets and sidewalks, members of the public are often the ones to alert public works officials to a problem. These issues

should be dealt with as soon as possible, since localized problems tend to get worse over time. Two areas that should receive special attention are areas around penetrations, which may settle differently from the pavement, and other areas that are depressed or where sand loss from between the pavers is noticed.

If not designed and planted properly, street trees and their roots can cause consternation not only to users, but also to maintenance crews when they cause upheaval of the pavement. All paving systems, including segmental, monolithic and other paving systems, can be subject to pressure and upheaval from tree roots. While root barriers should be specified during initial design, it is possible to install them years after planting a tree; however, root damage is likely to affect the tree's health. Roots that are causing upheaval should be carefully cut away and the pavement reinstalled according to proper guidelines.

Excessive sand loss and subsequent movement of pavers is another common issue that if not properly addressed, may result in a more substantial pavement failure. When brick pavers set in sand are installed properly they interlock and create a firm, stable surface. Without the friction developed by sand in the joints, adjacent pavers can quickly lose interlock. Appropriate joint thicknesses, proper aggregates for joints, and compaction will keep sand in place in most cases. Resweeping of sand to fill the top surfaces of joints may be required on an infrequent basis. Joint sand stabilizers or polymeric sand may aid in preventing excessive sand loss, particularly on pavements subjected to vehicular traffic.

Snow removal

Snow removal is an important issue for all pedestrians, especially for the disabled. Prompt snow removal will aid in clearing a route and may allow melting to start to occur. Deicing chemicals may also be necessary to create a clear path. Permeable pavements typically do not require as much snow removal and de-icing than conventional pavements so their use should be considered.

Clearing snow from clay pavements can be undertaken using plows, snow blowers, shovels and brushes as used for other pavements. Care must be taken to ensure that the blades of the equipment do not scrape the pavement surface in a manner that might cause chipping or dislodging of pavers. Rubber or urethane blade edges can be used, or proper blade height can be maintained above the pavement surface using guide wheels. Any residual snow can be cleared with brushes.

SUMMARY

Clay pavers have served pedestrians in a variety of applications for hundreds of years. These systems can perform as accessible pavements when proper design, construction and maintenance requirements are followed. Design and construction recommendations for accessible clay brick pavements are essentially the same design and construction requirements for standard brick installations so no extra cost is usually involved. Regular inspection and maintenance of the pavement surface and surrounding elements will provide a smooth surface for decades to come.

The information and suggestions contained in this Technical Note are based on the available data and the combined experience of engineering staff and members of the Brick Industry Association. The information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry. Final decisions on the use of the information contained in this Technical Note are not within the purview of the Brick Industry Association and must rest with the project architect, engineer and owner.

REFERENCES

1. 2010 ADA Standards for Accessible Design, Department of Justice, Washington, D.C., September 15, 2010.
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4. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way*, United States Access Board, Washington, D.C., July 26, 2011.

5. Urban, James. *Up By Roots*, ISA, 2008.
6. Wolf, E., Pearlman, J., Cooper, R.A., Fitzgerald, S.G., Kelleher, A., Collins, D.M., Boninger, M.L., Cooper, R., Smith, D.R., "Vibration Exposure of Individuals using Wheelchairs over Concrete Paver Surfaces," Proceedings of the Eighth International Conference on Concrete Block Paving, San Francisco, CA, International Concrete Pavement Institute, November 2006.

Acknowledgments

Scott Windley, Accessibility Specialist, U.S. Access Board
The Belden Brick Company
Boral Brick, Inc.
Endicott Clay Products Company
General Shale, Inc.
Glen-Gery Brick
Pine Hall Brick Company, Inc.
Stiles & Hart Brick Company
Whitacre Greer Company

The Case for Brick

Brick is Highly Durable - Brick is one of the longest lasting building materials on the planet. It has been used for centuries and has time-proven durability. While it may incur slight chips and minor cracks over time, brick tends to maintain its overall beauty as it ages. While the initial cost is higher, largely due to the labor associated with its installation, the durability and longevity of brick offsets the initial cost of brick over time making it cost-effective.

- Despite its strength, concrete is prone to cracking and has a much shorter lifespan, typically 20-30 years versus generations for brick. As concrete ages, the smooth outer surface wears down leaving the underlying crumbling aggregate exposed. Asphalt typically has a shorter useful life (10-20 years) and is more prone to cracking and deterioration, although repairs tend to be less expensive than with concrete.

Long Lasting Color - Brick maintains its color exceptionally well. Even when exposed to the sun, it will not fade.

- To mimic the look of brick, concrete requires the addition of pigment. Concrete treated in this manner quickly fades, particularly in sunlight. Prolonging the color requires routine application of a sealant, which increases maintenance time and costs. Color can be added to asphalt, typically by applying an acrylic coating, but this treatment is subject to wear and requires periodic reapplication.

Low Maintenance - Bricks are highly resistant to stains and serious cracking issues. Any necessary repairs tend to be easily addressed with minimal expense, and the finished repair will be seamless in appearance to the original construction. The longevity of brick and its low maintenance costs will offset the initial installation expense over time making it a cost-effective choice.

- Concrete stains easily and requires regular application of a sealant to protect from this risk, which increases maintenance time and costs. Concrete repairs are also typically more labor intensive and expensive than brick and the repaired area will never match the original construction. Asphalt repairs are typically cheaper than concrete, but patching will leave behind an unsightly repair. Stone dust requires regular maintenance in the spring and following significant rain events to remain compliant. Catch basins would be required to capture runoff given the slope of the land.

Environmentally Friendly - Bricks are a sustainable product made from renewable natural resources. They are permeable thus allowing rainwater to penetrate the ground. Bricks can last for centuries reducing the need for replacement and they are salvageable and reusable, which makes them recyclable.

- While permeable concrete and asphalt are now available, they only have a 15-30 useful life expectancy and require routine maintenance to prevent damage during freeze/thaw conditions. Concrete and asphalt are being recycled with more frequency than in years past, but the recycling process requires it be free of any contaminants such as glass, wood, paper, etc. This restriction, along with the need to use crushers that add to the demolition/construction costs and generate pollution, tends to complicate this process.

Historically Relevant and ADA-compliant - Grafton Common is one of the most intact Commons within the state of Massachusetts and the centerpiece of this community. As its stewards, the Historic District Commission is seeking to maintain and enhance its historic character while ensuring the materials used provide full accessibility for future generations to enjoy.

- Stone dust and brick are historically relevant materials that satisfy ADA/AAB requirements. While ADA/AAB-compliant, concrete and asphalt are not historically relevant materials.

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- <https://www.ada.gov/>
- <https://legalbeagle.com/8362658-ada-walkway-specifications.html>
- https://urldefense.proofpoint.com/v2/url?u=http-3A__www.gobrick.com_docs_default-2Dsource_read-2Dresearch-2Ddocuments_technicalnotes_14e-2Daccessible-2Dclay-2Dbrick-2Dpavements.pdf-3Fsfvrsn-3D0&d=DwlFAg&c=BX7Y4KpGhcDnlsgHKqkbfoiiDvjhxwuYUpcrPD7xrE&r=YQkHTKmNyPcJxNP6gWPJnoLHM77e-FbqJvZQRJnJems&m=mHyV2AouOnOZ7WLWEP4D--Y5Qj9nKysbG3EDJHiiZV0&s=TXklosJmjZBDouWtR7Frpas9SgFw6bfEw8VnrWBU-dk&e=
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- <https://www.greatdayimprovements.com/stamped-concrete-vs-patio-pavers-the-concrete-truth.aspx>

From: Bill Yeomans <billyeo@verizon.net>

Sent: Tuesday, July 30, 2019 8:21 AM

To: bosgroup@graffton-ma.gov; Tim McInerney <mcinerneyt@graffton-ma.gov>; MeekinsR@graffton-ma.gov

Subject: ADA Self-Evaluation and Transition Plan & Conflict with Grafton Common Walkway Restoration Project

Tuesday, July 30, 2019

Bruce Spinney, Chair, Grafton Select Board

Select Board Members

Tim McInerney, Town Administrator

Town of Grafton

30 Providence Road

Grafton MA 01519

A good day to you all,

Last week, the Grafton News reported a story about the 2019 Town of Grafton ADA Self-Evaluation and Transition Plan that was presented to your Board on July 16th. This plan was conducted by The Center for Living and Working for the Town of Grafton.

Their story headline read; "Report shows there are many needs to be ADA compliant."

"With plans to upgrade the historic Grafton Common, the idea of installing brick walkways may be historically correct but poses a hazard to handicapped accessibility."

The article reported that the study was funded by a Grant of \$35,000 the town had sought and received from the Massachusetts Office on Disability for a town wide ADA Compliance Study. This grant is a great example of Grafton acting proactively in this matter to possibly obtain future grants to fund corrective ADA actions in town.

Last evening, I watched the replay of your July 16th Select Board meeting wherein an overview of this study was presented to the Board.

The Town Common discussion was of particular interest to me as I had recently presented my unsuccessful opposition to the proposed brick walkway brought forth by the HDC at May Town Meeting.

One of the individual presenting from The Center for Living and Working, who is wheelchair dependent himself, spoke strongly against brick paver walkways.

To me, his most memorable comment regarding brick walkways was "they're a nightmare." He discussed the reasons for his point of view including uneven surface vibrations, and the ongoing maintenance to the bricks required by upheavals to them from yearly weather impacts.

Selectman Peter Carlson also raised the question of the conflict regarding the brick paver walkways proposed for the Common and our ADA goals.

I find it dismayed that as a town, we are showing great concern and taking reasonable, appropriate and costly action to deal with the many non ADA Compliance issues in our town properties and buildings as

evidenced in this recent study while at the same time will be encouraging non-compliance, at some level, by allowing the brick walkway portion of this Town Common Restoration Project to proceed.

This project will install brick walkways that many consider to be less ADA compliant and handicap accommodating than what presently exists in the blacktop covered walkways.

While TM approved CPA funds can be used for the Town Common Restoration Project, they cannot be used for the ongoing future maintenance of the brick walkways. That maintenance chore and costs will be borne by the town alone.

I believe the brick paver walkway portion of this project is in direct conflict with our town's goal of becoming more ADA Compliant whenever possible while bounded by practical and financial constraints.

Funding for this Community Preservation Act project brought forth by the Historic District Commission for the Town Common Restoration has been approved by the Community Preservation Commission and May Town Meeting.

Since CPC and Town Meeting approved funding cannot be rescinded or reallocated for this project, I suggest and ask the Select Board to place a hold on signing any contracts associated with the walkway portion of the Grafton Common Restoration Project until this conflict is discussed and resolved by the Board to your satisfaction, while abiding by the dictates of the Americans With Disabilities Act and our town's ADA Compliance goals.

I request that this walkway portion of the Town Common Restoration Project topic be placed on the Agenda of an upcoming Select Board meeting to review and discuss this ADA Compliance conflict at a Public Hearing.

I thank you in advance for your consideration of my concern. I'm available to discuss further at your convenience.

Cordially and respectfully submitted,
Bill Yeomans
297 Providence Road
South Grafton, MA 01560

Sent from my iPad

4 (b) NEW BUSINESS: BLUE WAVE PILOT AGREEMENT, 43 ESTABROOK AVE., (BWC Lake Ripple LLC)

The board will be asked to consider entering into an Agreement for Payment of Taxes for Personal Property. The developer will build, own and operate a solar facility on land located at 43 Estabrook Ave.

MOTION:

I move the board vote to authorize the Chairman to sign the Agreement for Payment of Taxes for Personal Property with BWC Lake Ripple LLC, BlueWave Solar.

AGREEMENT FOR PAYMENT OF TAXES FOR PERSONAL PROPERTY

THIS AGREEMENT FOR PAYMENT OF TAXES FOR PERSONAL PROPERTY (this "Agreement") is made and entered into as of _____, 2019 by and between BWC Lake Ripple, LLC, a Delaware limited liability company ("Developer"), and the TOWN OF GRAFTON, a Massachusetts municipal corporation duly established by law and located in Worcester County, Commonwealth of Massachusetts (the "Town"). Developer and the Town are collectively referred to in this Agreement as the "Parties." and may each be individually referred to as a "Party."

WHEREAS, Developer has built, owns and operates (or plans to build, own and operate) a photovoltaic solar facility (the "Project"), with a nameplate capacity of approximately 2 megawatts ("MW"), alternating current ("AC"), on approximately 15.63 acres of land located at 43 and 44 Estabrook Avenue, Grafton, MA, 01519, as more particularly shown on Assessor's Map 49, Lot 6, a copy of which map is included in Exhibit A (the "Property");

WHEREAS, it is the intention of the Parties that Developer make annual payments to the Town for the term of this Agreement in lieu of personal property taxes for the Project, in accordance with G.L. c.59, §38H (Acts of 1997 Chapter 164, Section 71(b), as amended), and any Massachusetts Department of Revenue ("DOR") regulations adopted in connection therewith;

WHEREAS, because both Developer and the Town need an accurate projection of their respective expenses and revenues with respect to the real and personal property that is taxable under law, the Parties believe that it is in their mutual best interests to enter into this Agreement fixing the payments that will be made with respect to all taxable real and personal property incorporated within the Project for the term of the Agreement;

WHEREAS, the Parties intend that, during the term of the Agreement, Developer will not be assessed for statutory personal property taxes to which it might otherwise be subjected under Massachusetts law for the Project, and this Agreement will provide for the exclusive payments in lieu of such personal property taxes during the term hereof, provided, however, that the Parties do not intend for this Agreement to affect any direct payments for services provided by the Town to the Project, including but not limited to, permit fees, consultant services associated with any permit applications, water and sewer services, and similar payment obligations not in the nature of personal property taxes that Developer is otherwise obligated to pay the Town, and it shall not affect any other taxes that may be owed by Developer or Property Owner, including, but not limited to real property taxes for the Property, and taxes for personal property other than the Project;

WHEREAS, the Town is authorized to enter into this Agreement with Developer, provided the payments in lieu of personal property taxes over the life of the Agreement are reasonably deemed a fair approximation of the tax payments that would otherwise be assessed under G.L. c.59 based upon the full and fair cash valuation of the Project; and

WHEREAS, the Parties have reached this Agreement after good faith negotiations.

NOW THEREFORE, in exchange for the mutual commitments and other good and valuable consideration, the receipt and sufficiency of which are acknowledged, the parties agree as follows:

1. Payment in Lieu of Personal Property Taxes. Subject to the terms and conditions hereof, Developer agrees to make annual payments to the Town in lieu of personal property taxes for the Project for a period of twenty (20) consecutive years. Each annual payment will be equal to the amount set forth in (or shall be equal to the amount calculated in accordance with the formula set forth in) Exhibit B attached hereto (the "Annual Payment(s)"). Each Annual Payment will be paid to the Town in four (4) equal quarterly installments, each of which shall be due on or before August 1, November 1, February 1, and May 1 (each a "Quarterly Payment Date") of each fiscal tax year during the term of this Agreement, with each fiscal tax year running from July 1-June 30. Each quarterly payment amount and due date will be noted on a "tax bill" to be issued by the Town to the Developer, provided that any failure of the Town to issue such a bill shall not relieve Developer of its obligation to make timely payments by the dates aforesaid. Payments under this Agreement shall commence on the date which is the first Quarterly Payment Date after the Notice of Authorization to Interconnect issued by the local electric distribution company (the "Notice to Interconnect") and shall continue thereafter during the term of this Agreement and end with the last quarterly payment due on May 1 of the twentieth (20th fiscal year following the Notice to Interconnect. This Agreement shall expire at the end of the twentieth (20th fiscal year following the Notice to Interconnect. In the event that this Agreement is terminated on a date other than the last day of a fiscal tax year, the Annual Payment payable hereunder for that tax year shall be prorated based upon a 365-day year.

Except as expressly provided in Paragraphs 2, 3 and 4, Developer agrees that the Annual Payments will not be reduced for any reason (including without limitation on account of a depreciation factor, revaluation or reduction in the Town's tax rate, or legislative action fixing or otherwise setting taxes or payments in lieu thereof for photovoltaic solar facilities), and the Town agrees that, other than as expressly set forth in this Agreement, the Annual Payments will not be increased including without limitation on account of an inflation factor, revaluation or increase in the Town's tax rate or assessment percentage. Developer hereby waives, during the term of this Agreement, any rights it may have otherwise had in the absence of this Agreement to seek, for any reason and in any forum, an abatement or reduction of taxes assessed for the Project, and therefore, waives any such rights with respect to any payments in lieu of taxes assessed in accordance with the provisions of this Agreement.

Notwithstanding anything to the contrary in this Agreement, in the event Developer's leasehold interest in the Property is, other than due to an assignment or sale of Developer's leasehold interest in the Property, discontinued before expiration of the term of this Agreement, whether by way of the expiration or termination of the

lease between the Developer and the Property Owner or otherwise, and either: (i) Developer does not then own the Property; or (ii) the Property Owner does not then purchase the Project from the Developer and take assignment of this Agreement pursuant to Section 7 hereof, then this Agreement shall also terminate automatically as of the date of such discontinuance, and the Town shall proceed to assess taxes for the Project and on the Property under applicable Laws and regulations as if this Agreement never existed. Developer shall immediately notify the Town in writing in the event of any such discontinuance of its leasehold interest, failing which Developer and the Property Owner shall, notwithstanding anything to the contrary in this Agreement, remain responsible for all payments due under this Agreement.

2. Improvements or Additions. Removals. Except as otherwise provided in Paragraph 3, if the Developer makes any capital improvements or adds any equipment or personal property to the Project or replaces any existing improvements, equipment or personal property (collectively, "personal property"), Annual Payments will be increased if such personal property adds value to the Project, as determined in accordance with Paragraph 3. If at any time the Developer removes personal property from the Project, the Annual Payments will be decreased if such removal reduces the value of the Project, as determined in accordance with Paragraph 3, provided that destruction of or damage to all or a portion of the Project by Force Majeure shall not constitute a removal of personal property for the purpose of this Paragraph 2, and shall instead be subject to Paragraph 11 (Force Majeure). In the event that, after the date of this Agreement, personal property is added to or removed from the Project in any calendar year, such personal property, together with the proposed value of each item of such personal property, shall be separately and conspicuously identified as "new" or "removed" in the Annual Inventory Update to be provided by Developer annually as set forth in paragraph 4.

Notwithstanding the foregoing, consistent with applicable Massachusetts Department of Revenue regulations, only the addition of equipment on or after the Notice to Interconnect that adds value to the Project (not including replacement of existing equipment, machinery, and pollution control and other equipment that is exempted from local property taxes) will lead to an increase in the payments in lieu of taxes due under this Agreement. No additional payments in lieu of property taxes will be due or required for: (i) replacement of personal property or equipment or machinery that is nonfunctional, obsolete, or is replaced solely due to wear and tear or casualty or as part of scheduled or unscheduled maintenance; or (ii) pollution control equipment that is exempted from taxation by the provisions of General Laws Chapter 59, section 5(44) or other applicable laws or regulations in effect from time to time; or (iii) equipment installed as required by or in response to any statute, law, regulation, consent decree, order, or case mandating additional control of any emission or pollution.

3. Calculation of Adjustment. If Developer adds new personal property to the Project or replaces existing personal property, and if such personal property increases the value of the Project, as reasonably determined by the Town's Board of Assessors in

accordance with Massachusetts General Laws and regulations, the remaining Annual Payments under this Agreement will be increased by an amount to be negotiated in good faith by the Parties. Similarly, if Developer removes personal property from the Project, and if such removal decreases the value of the Project, as reasonably determined solely by the Town's Board of Assessors in accordance with Massachusetts General Laws and applicable regulations, the remaining Annual Payments under this Agreement will be decreased by an amount to be negotiated in good faith by the Parties, provided that destruction of or damage to all or a portion of the Project by Force Majeure shall not constitute a removal of personal property for the purpose of this Paragraph 3, and shall instead be subject to Paragraph 11 (Force Majeure). If the Parties are unable to agree to adjustments to Annual Payments within sixty (60) days of the Town's receipt of an Annual Inventory Update, then (i) for new or replacement personal property, the Town shall assess taxes on the additional or replacement personal property as if this Agreement did not exist, and (ii) as to personal property removed from the Project by Developer, Annual Payments shall not be reduced, and in either case, Developer shall have the right to seek an abatement and exercise other rights as a taxpayer with respect to any taxes assessed on such property as it would if this Agreement did not exist.

Notwithstanding the foregoing, in the event that the aggregate value of any new, replacement, or removed personal property that would result in an adjustment to Annual Payments under the preceding paragraph in any one calendar year is less than \$10,000, as reasonably determined by the Town's Board of Assessors, such personal property shall not result in an increase (for new or replacement property) or a decrease (for property removed from the Project) in Annual Payments. For the avoidance of doubt, in the event, in any calendar year, the aggregate value of new, replacement or removed personal property exceeds \$10,000, the entire value of such personal property (and not only the amount that exceeds \$10,000) shall result in an adjustment in Annual Payments in accordance with this Paragraph 3.

If at any time during the term of this Agreement the nameplate capacity of the Project for any reason changes so as to be greater or less than 2.0 MW (AC), and an adjustment is not being made pursuant to the provisions above, the Annual Payments shall be increased or decreased (as applicable) at a rate of \$12,000 per MW (AC) of changed capacity. Within fourteen (14) days following any such change, Developer shall notify the Town in writing of such change, and provide such other information as the Town may reasonably request. Failure to provide such notice shall constitute a material breach of this Agreement.

4. Inventory. Attached to this Agreement as Exhibit C is an itemized inventory prepared by Developer (the "Inventory") of the equipment and other personal property ("personal property") that has been or will be incorporated into the Project, together with the aggregate fair market values of the personal property, along with the estimated annual production of electricity, in kilowatt-hours, to be generated by the Project. The Parties understand and agree that the Annual Payments were determined using and relying upon the Inventory. Developer will update the Inventory annually

as of January 1 of each year to reflect any improvements, additions or removals and for the purposes set forth in Sections 2 and 3 above; and the updated written Inventory, referred to as an Annual Inventory Update, will be provided to the Town on or before March 1 of each year, together with notice of any changes to the overall system capacity, with supporting documentation. The Town, its officers, employees, consultants, agents and attorneys will have the right (with reasonable prior notice and at a mutually convenient time) to periodically to inspect the Project and review documents in possession of Developer that relate to the Project and Inventory to verify the Inventory and Developer's compliance with this Agreement.

In addition, the Developer shall, upon signing this Agreement or, if it has not yet been filed with the utility, promptly after it is filed with the utility, provide to the Town a copy of Developer's interconnection application filed with the utility, and a copy of Developer's interconnection agreement with the utility promptly after it has been signed, including any future amendments to such application or agreement.

5. Payment Collection. All rights and remedies available to the Town for the collection of taxes shall apply to the Annual Payments hereunder, including, but not limited to, the rights and remedies provided in G.L. c. 59 and G.L. c. 60, and all such rights and remedies are hereby reserved notwithstanding anything to the contrary herein. Moreover, the provisions of the General Laws, including but not limited to G.L. c. 59 and G.L. c. 60, will govern the establishment of liens and the collection of the Annual Payments as though said payments were real property taxes due and payable to the Town. Developer shall pay interest on late payments at the rate of 14 percent per annum as set forth in G.L. c. 59, § 57, for late payments of taxes or assessments. In addition to, and not in limitation and not a waiver of, any other rights and remedies available to the Town, in the event Developer fails to make any payments required under this Agreement, and/or to the extent the Town and Developer are unable to agree to any increases to Annual Payments for additional capital improvements or personal property as set forth in Paragraph 3, the Town may, at its sole election, assess taxes for that portion of the Project to which such payments or increases are deemed to relate, as determined by the Town's Board of Assessors. If and to the extent necessary for assessment of such truces, such portions of the Project shall be deemed to be property unintentionally omitted from annual assessment under G.L. c. 59, § 75. And if Developer breaches its payment obligations under this Agreement and fails to cure same and the Town elects to pursue collection of the monies owed, then, at the Town's sole election and notwithstanding anything to the contrary in this Agreement, for the purpose of collection of Annual Payments, the entirety of the Project shall be deemed "Real Property," as defined in G.L. c. 59, § 2A(a).
6. Tax Status. Notwithstanding anything to the contrary in this Agreement, in the event Developer fails to timely make payments required by this Agreement, the Parties agree that, for the purpose of collection of such payments under G.L. c. 59 and in addition to any other remedies available to the Town for such failure, the entirety of the Project may, at the sole discretion of the Town, be deemed "Real Property," as defined in G.L. c. 59, § 2A(a). The Town agrees that during the term of this

Agreement, the Town will not assess Developer for any personal property taxes with respect to the Project to which Developer might otherwise be subject under Massachusetts law, and the Town agrees that this Agreement will exclusively govern the payments of all personal property taxes and payments in lieu of such taxes that Developer will be obligated to make to the Town with respect to the Project. provided, however, that this Agreement is not intended to affect, and will not preclude, other assessments of general applicability by the Town for excise taxes on vehicles due pursuant to G.L. c.60A and for services provided by the Town to the Project, including but not limited to, permit fees and consultant services. And notwithstanding anything to the contrary in this Agreement, this Agreement does not affect or limit in any way the assessment and collection of taxes for personal property not included in the Inventory, as the same may be updated in accordance with this Agreement, and real property taxes for property other than the Property, which will continue to be assessed notwithstanding this Agreement. In addition, notwithstanding anything to the contrary herein, if at any time following the Effective Date the Massachusetts Department of Revenue or any court or other agency of competent jurisdiction determines or declares that this Agreement unlawfully provides for payments in lieu of property taxes on certain property, this Agreement shall be deemed not to provide for payments in lieu of property taxes on such property and the payments to be made by Developer hereunder for a particular period shall be reduced by the amount of any property taxes on such property assessed by and paid to the Town for such period; provided, however, in the event that, with respect to a particular 12-month period, the sum of such reduced payments and any such property taxes exceeds the payments that would have been due under Exhibit C for such period, Developer shall have the right to terminate this Agreement upon notice to the Town.

7. Assignment. Developer shall not assign this Agreement in whole or in part without the advance written consent of the Town, except that Developer may collaterally assign the Agreement to an entity providing financing for construction or operation of the Project with advance written notice to (but not consent of) the Town. This Agreement will be binding upon the successors and assigns of Developer, and the obligations created hereunder will run with the Project and Developer's interest in the Property.
8. Partial Invalidity. If for any reason, including a change in applicable law, it is ever determined that this Agreement may not apply to the personal property the parties agree that notwithstanding said determination or change in law that this Agreement will be deemed to continue to apply to the personal property, and the Town will thereafter be entitled to assess and tax the real property in accordance with G.L. c. 59 and G.L. c. 60, and Developer will be entitled to challenge such assessments and truces in accordance with Massachusetts law, with the Parties having all rights of a Town and a taxpayer with regard to such real estate taxes. This Agreement will not apply to real estate truces. The Parties will cooperate with each other, and use reasonable efforts to defend against and contest any challenge to this Agreement by a third party. If for any reason, including a change in applicable law, a property true is imposed on the Project or the Property in addition to the payments in lieu of taxes due

under this Agreement, the payments in lieu of taxes due under this Agreement will be decreased on an annual basis by the amount of the property taxes actually paid to the Town for each year. If for any reason, including a change in applicable law, a payment in lieu of taxes is provided for that is less than that provided for in Paragraph 1 of this Agreement, any amount provided for in this Agreement over and above such lesser amount shall be considered a payment by Developer to the Town as the host community of the Project. In no event, except as provided for in Paragraph 2 and 3 hereof, shall the payment amounts provided for herein be reduced below the level called for in Paragraph 1. Only in the event that this Agreement is determined to be invalid in accordance with applicable law shall this agreement be void and of no further effect and the Developer shall continue to make payments as noted above.

9. Notices. All notices, consents, requests, or other communications provided for or permitted to be given hereunder by a Party must be in writing and will be deemed to have been properly given or served upon the personal delivery thereof, via courier delivery service, or by mail in a manner of delivery that results in a confirmation of receipt, such as certified mail or federal express. Such notices shall be addressed or delivered to the Parties at their respective addresses shown below.

Developer:

BWC Lake Ripple, LLC
111 Huntington Ave, Suite 650
Boston, MA 02199

Town of Grafton:

Town Administrator
Grafton Municipal Center
30 Providence Road
Grafton, MA 01519

Any such addresses for the giving of notices may be changed by either Party by giving written notice as provided above to the other Party. Notice given by counsel to a Party shall be effective as notice from such Party.

10. Applicable Law. This Agreement will be made and interpreted in accordance with the laws of the Commonwealth of Massachusetts without regard to the law of "conflicts of laws." The Parties each consent to the jurisdiction of the Massachusetts courts or other applicable agencies of the Commonwealth of Massachusetts regarding any and all matters, including interpretation or enforcement of this Agreement or any of its provisions. Venue for any action brought hereunder shall be the courts of Worcester County, Massachusetts. With respect to any period in which Developer does not have a registered agent for service of process in Massachusetts, Developer agrees to accept service of process, including civil complaints, by certified mail at the address indicated in Paragraph 9 (Notices).

11. Force Majeure. The Parties recognize that there is the possibility during the term of this Agreement that all or a portion of the Property or Project may be damaged or destroyed or otherwise rendered unusable due to events beyond the control of either Party. These events are referred to as "Force Majeure." As used herein, Force Majeure includes, without limitation, the following events:

- i. Acts of god including floods, winds, storms, earthquake, fire or other natural calamity;
- ii. Acts of War or other civil insurrection or terrorism; or
- iii. Taking by eminent domain by any governmental entity of all or a portion of the Property or the Project.

In the event an event of Force Majeure occurs during the term of this Agreement with respect to any portion of the Property or Project that renders the Property or Project unusable for the customary purpose of the production of electricity for a period of more than sixty (60) days, then Developer may, at its election, notify the Town of the existence of this condition as well as of its decision whether or not to rebuild that portion of the Property or Project so damaged or destroyed or taken. If Developer elects not to rebuild, it may terminate the Agreement upon 30 days written notice, and the Project will thereafter be assessed and taxed as if this Agreement does not exist. Notwithstanding the foregoing or any Force Majeure event, Developer shall continue to make all payments required under this Agreement without abatement or reduction unless and until this Agreement is terminated, if at all, under this Paragraph 11.

12. Certification of Tax Compliance. Pursuant to G.L. c. 62C, § 49A, the undersigned Developer by its duly authorized representative certifies that it has complied with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

13. Covenants, Representations and Warranties of Developer and Town.

- a. During the term of the Agreement, Developer will not voluntarily do any of the following:
 - i. convey by sale, lease or otherwise any interest in the Property or Project to any tax-exempt entity or organization, including without limitation a charitable organization pursuant to G.L. c.59, § 5 (Clause Third);
 - ii. fail to pay the Town all amounts due hereunder when due in accordance with the terms of this Agreement;

- iii. seek, for any reason, an abatement or reduction of any of the amounts assessed in accordance with the terms of this Agreement, and Developer hereby waives, during the full term of this Agreement, any rights it may have otherwise had to seek such an abatement or reduction; or
- iv. seek to amend or terminate this Agreement on account of the enactment of any law or regulation or a change in any existing law or regulation the intent or effect of which is to fix or limit in any way the method for calculating payments-in-lieu-of-taxes for renewable energy facilities.

b. Developer represents and warrants:

- i. It is a corporation or other business entity duly organized, validly existing and in good standing under the laws of the state in which it was formed, and if a foreign corporation, is registered with the Massachusetts Secretary of State, and has full power and authority to carry on its business as it is now being conducted.
- ii. This Agreement constitutes the legal, valid and binding obligation of Developer enforceable in accordance with its terms, except to the extent that the enforceability may be limited by applicable bankruptcy, insolvency or other laws affecting other enforcement of creditors' rights generally or by general equitable principles.
- iii. It has taken all necessary action to authorize and approve the execution and delivery of this Agreement.
- iv. The person executing this Agreement on behalf of Developer has the full power and authority to bind it to each and every provision of this Agreement.
- v. To the best of Developer's knowledge, and based on Developer's review of the current application, and its understanding, of the applicable Massachusetts laws and regulations as they exist on the date hereof, Developer is a "generation company" or "wholesale generation company" as those terms are used and defined in G.L. c. 59, § 38H(b).
- vi. Developer does not qualify for a manufacturing classification exemption pursuant to G.L. c. 59, § 5(16)(3), as such statute exists on the date hereof (provided that Developer shall timely notify the Town of any change to such statute that, to Developer's knowledge, would cause the Developer to qualify for a manufacturing classification exemption).
- vii. The documents and information furnished by Developer to the Town in connection with this Agreement, including but not limited to the Inventory

and any update thereto, is, true, accurate and complete in all material respects.

- viii. The performance of Developer's obligations under this Agreement will not violate or result in a breach or default of any agreement or instrument to which Developer is a party or to which Developer is otherwise bound.

14. Good Faith. The Parties will act in good faith to implement this Agreement.
15. Entire Agreement. The Parties agree that this is the entire, fully integrated Agreement between them with respect to payments in lieu of taxes for the Project, and that there are no third-party beneficiaries to this Agreement.
16. Termination. Notwithstanding anything to the contrary in this Agreement, the Town may terminate this Agreement on thirty (30) days written notice to Developer if:
 - a. The Developer (or Developer's Secured Lender) fails to make timely payments required under this Agreement, unless such payment is received by the Town within the 30-day notice period with interest as stated in this Agreement, provided, however, that the Town may nonetheless terminate this Agreement if such failure occurs more than three times in any rolling 365-day period, even if each such failure is cured within the 30-day notice period provided the Town delivered notice to Developer of each such failure in accordance with this Section;
 - b. The Developer has filed, or has had filed against it, a petition in bankruptcy (and any such involuntary filing is not dismissed within 60 days), or is otherwise insolvent;
 - c. The Developer otherwise materially breaches this Agreement, unless such breach is cured by Developer or Developer's Secured Lender (which shall have the right but not the obligation to act on Developer's behalf to cure any breach or default by Developer pursuant to Section 17 hereof) within the 30-day notice period provided, however, that the Town may nonetheless terminate this Agreement if Developer otherwise materially breaches this Agreement more than three times in any rolling 365-day period, even if each such breach is cured within each 30-day notice period, provided the Town has delivered notice to Developer of each such failure in accordance with this Paragraph; and/or
 - d. The Developer's representations set forth in Paragraph 13 were untrue, inaccurate, or incomplete in material respects at the time they were made, such misrepresentations have materially adversely affected the Town and Developer has failed to remedy such adverse effect within 60 days following notice from the Town.

Notwithstanding anything herein to the contrary, the Developer, or its successors or assigns, may terminate this Agreement on thirty (30) days' written notice to the Town

in the event that, and only after, (i) the Lease is terminated and the Project has been decommissioned and removed from the Property, or (ii) the Project ceases commercial operation and is decommissioned and has been removed from the Property.

17. Lender's Right to Cure. The Town shall use good faith efforts to send a copy of any notice of default sent to Developer to Developer's secured lender ("Developer's Secured Lender") by certified mail at the same time such notice is sent to Developer, and where this Agreement expressly provides for a cure of said default, no such notice of default to Developer shall be effective unless and until (a) a copy of such notice has been delivered to Developer's Secured Lender, and (b) the applicable cure period, beginning on the date of such delivery, has expired. Developer's Secured Lender shall have the same time and rights to cure any default as Developer, and the Town shall accept a cure by Developer's Secured Lender as if such cure had been made by Developer, provided said cure is made in accordance with the provisions of this Agreement. Developer shall provide written notice to the Town as to the name and address of Developer's Secured Lender for such notices to be sent.
18. Required Approval and Termination. This Agreement shall not be effective unless and until it is approved by: the Town Meeting of the Town of Grafton; the Grafton Board of Assessors; and the Grafton Board of Selectmen ("Town Approval"). Notwithstanding anything to the contrary herein, this Agreement may be terminated by either Party upon notice to the other Party if: (i) this Agreement is not approved by the Town acting by affirmative votes of its Town Meeting, Board of Assessors, and Board of Selectmen on or before _____ and (ii) the Notice to Interconnect has not occurred by _____.
19. Miscellaneous.
 - a. A Notice of this Agreement may be recorded by Developer in the applicable Registry of Deeds upon execution.
 - b. Upon execution of this Agreement, the Developer shall pay the Town by bank or certified check, or wire transfer, the amount of \$5,000 representing payment of expenses incurred by the Town in negotiation of this Agreement.
 - c. Pursuant to G.L. c. 62C, § 49A, the undersigned Developer by its duly authorized representative certifies that it is in tax compliance with the tax laws of the Commonwealth of Massachusetts.

[Execution Page to Follow]

Executed under seal by the undersigned as of the day and year first written above, each of whom represents that it is fully and duly authorized to act on behalf of and bind its respective Party.

TOWN OF GRAFTON

BWC LAKE RIPPLE, LLC

By: _____

Title: _____

Date: _____

By: _____

Title: Authorized Signatory

Date: _____

EXHIBIT A

The Property

Lease Area 1 Description:

Non-Exclusive Access Easement **44 Estabrook Avenue, Grafton Massachusetts**

A certain parcel of land situated in the Town of Grafton on the southerly side of Estabrook Avenue, County of Worcester, and Commonwealth of Massachusetts is bounded and described as follows:

Commencing at a drill hole in the stone wall face at the southwest corner of land now or formerly Knowlton Farms Nominee Trust, as depicted on a plan filed as Plan Book 903, Plan 23 with the Recorded Land Division of the Worcester South District Registry of Deeds; thence running N 82° 45' 52" E across Estabrook Avenue a distance of two hundred fifty-two and seventy hundredths (252.70') feet to the point of beginning, thence:

N 84° 31' 25" E	A distance of twenty-one and ten hundredths (21.10') feet along the southerly sideline of said Estabrook Avenue to a point; thence
N 85° 54' 19" E	A distance of forty-nine and no hundredths (49.00') feet along the southerly sideline of said Estabrook Avenue to a point; thence
S 20° 03' 27" W	A distance of one hundred seventy-two and seventy-two hundredths (172.72') feet to a point; thence
S 55° 36' 41" W	A distance of one hundred forty-five and fifty-one hundredths (145.51') feet to a point; thence
S 28° 07' 46" W	A distance of four hundred eighty-one and forty-three hundredths (481.43') feet to a point; thence
S 27° 54' 24" W	A distance of one hundred twenty-eight and seventy-six hundredths (128.76') feet to a point; thence
S 45° 00' 00" W	A distance of thirty-two and seventy-four hundredths (32.74') feet to a point; thence
N 45° 00' 00" W	A distance of two hundred forty-two and ninety hundredths (242.90') feet to a point; thence
N 66° 08' 52" E	A distance of two hundred fifty-one and eighty-seven hundredths (251.87') feet to a point; thence
N 17° 43' 45" E	A distance of two hundred twenty-seven and twenty-nine hundredths (227.29') feet to a point; thence
N 43° 15' 35" E	A distance of four hundred twenty-six and eleven hundredths (426.11') feet to the point of beginning

Said land is depicted as Non-Exclusive Access Easement having an area of 107,884 more or less square feet (2.48 acres) on a plan entitled "44 Estabrook Avenue Exhibit Plan in Grafton, Massachusetts prepared for Knowlton Farms Nominee Trust" dated June 4, 2019, prepared by Meridian Associates, Inc.

Lease Area
44 Estabrook Avenue, Grafton Massachusetts

A certain parcel of land situated in the Town of Grafton off the southerly side of Estabrook Avenue, County of Worcester, and Commonwealth of Massachusetts is bounded and described as follows:

Commencing at a drill hole in the stone wall face at the southwest corner of land now or formerly Knowlton Farms Nominee Trust, as depicted on a plan filed as Plan Book 903, Plan 23 with the Recorded Land Division of the Worcester South District Registry of Deeds; thence running N 82° 45' 52" E across Estabrook Avenue a distance of two hundred fifty-two and seventy hundredths (252.70') feet; thence S 43° 15' 35" W a distance of four hundred twenty-six and eleven hundredths (426.11') feet, thence S 17° 43' 45" W a distance of two hundred twenty-seven and twenty-nine hundredths (227.29') feet, thence S 66° 08' 52" W a distance of two hundred fifty-one and eighty-seven hundredths (251.87') feet, thence S 45° 00' 00" E a distance of one hundred twenty-seven and fifty-four (127.54') feet to the point of beginning, thence;

S 45° 00' 00" E	A distance of one hundred fifteen and thirty-six hundredths (115.36') feet to a point; thence
N 45° 00' 00" E	A distance of thirty-two and seventy-four hundredths (32.74') feet to a point; thence
S 45° 00' 00" E	A distance of one thousand sixty and eleven hundredths (1060.11') feet to a point; thence
S 45° 00' 00" W	A distance of three hundred sixty-five and twenty-nine hundredths (365.29') feet to a point; thence
N 45° 00' 00" W	A distance of two hundred forty-one and no hundredths (241.00') feet to a point; thence
S 45° 00' 00" W	A distance of one hundred thirty-three and eighty-three hundredths (133.83') feet to a point; thence
N 45° 00' 00" W	A distance of one hundred twenty and fifty hundredths (120.50') feet to a point; thence
S 45° 00' 00" W	A distance of two hundred forty-nine and twenty hundredths (249.20') feet to a point; thence
N 45° 00' 00" W	A distance of one hundred forty-eight and no hundredths (148.00') feet to a point; thence
N 09° 39' 22" E	A distance of three hundred twelve and forty-five hundredths (312.45') feet to a point; thence
N 45° 00' 00" W	A distance of eighty-one and forty-nine hundredths (81.49') feet to a point; thence
N 20° 07' 16" W	A distance of one hundred seventy-eight and thirty-seven hundredths (178.37') feet to a point; thence
N 01° 28' 55" E	A distance of four hundred nine and fifteen hundredths (409.15') feet to a point; thence
N 45° 00' 00" E	A distance of twenty-nine and three hundredths (29.03') feet to a point; thence
N 78° 36' 16" E	A distance of seventy-one and ninety-six hundredths (71.96') feet to the point of beginning

Said land is depicted as Lease Area having an area of 554,958 more or less square feet (12.74 acres) on a plan entitled "44 Estabrook Avenue Exhibit Plan in Grafton, Massachusetts prepared for Knowlton Farms Nominee Trust" dated June 4, 2019, prepared by Meridian Associates, Inc.

Solar Easement
44 Estabrook Avenue, Grafton Massachusetts

A certain parcel of land situated in the Town of Grafton off the southerly side of Estabrook Avenue, County of Worcester, and Commonwealth of Massachusetts is bounded and described as follows:

Commencing at a drill hole in the stone wall face at the southwest corner of land now or formerly Knowlton Farms Nominee Trust, as depicted on a plan filed as Plan Book 903, Plan 23 with the Recorded Land Division of the Worcester South District Registry of Deeds; thence running N 82° 45' 52" E across Estabrook Avenue a distance of two hundred fifty-two and seventy hundredths (252.70') feet; thence S 43° 15' 35" W a distance of four hundred twenty-six and eleven hundredths (426.11') feet, thence S 17° 43' 45" W a distance of two hundred twenty-seven and twenty-nine hundredths (227.29') feet, thence S 66° 08' 52" W a distance of two hundred fifty-one and eighty-seven hundredths (251.87') feet to the point of beginning, thence;

S 45° 00' 00" E	A distance of one hundred twenty-seven and fifty-four hundredths (127.54') feet to a point; thence
S 78° 36' 16" W	A distance of seventy-one and ninety-six hundredths (71.96') feet to a point; thence
S 45° 00' 00" W	A distance of twenty-nine and three hundredths (29.03') feet to a point; thence
S 01° 28' 55" W	A distance of four hundred nine and fifteen hundredths (409.15') feet to a point; thence
S 20° 07' 16" E	A distance of one hundred seventy-eight and thirty-seven hundredths (178.37') feet to a point; thence
S 45° 00' 00" E	A distance of eighty-one and forty-nine hundredths (81.49') feet to a point; thence
S 09° 39' 22" W	A distance of three hundred twelve and forty-five hundredths (312.45') feet to a point; thence
S 45° 00' 00" E	A distance of one hundred forty-eight and no hundredths (148.00') feet to a point; thence
N 45° 00' 00" E	A distance of two hundred forty-nine and twenty hundredths (249.20') feet to a point; thence
S 45° 00' 00" E	A distance of one hundred twenty and fifty hundredths (120.50') feet to a point; thence
N 45° 00' 00" E	A distance of one hundred thirty-three and eighty-three hundredths (133.83') feet to a point; thence
S 45° 00' 00" E	A distance of two hundred forty-one and no hundredths (241.00') feet to a point; thence
N 45° 00' 00" E	A distance of three hundred sixty-five and twenty-nine hundredths (365.29') feet to a point; thence
N 45° 00' 00" W	A distance of one thousand sixty and eleven hundredths (1060.11') feet to a point; thence
N 27° 54' 24" E	A distance of one hundred twenty-eight and seventy-six hundredths (128.76') feet to a point; thence
S 69° 56' 33" E	A distance of one hundred fifty-two and twenty-one hundredths (152.21') feet to a point; thence
S 20° 03' 27" W	A distance of one hundred sixty-three and ninety-two hundredths (163.92') feet to a point; thence

S 45° 00' 00" E	A distance of one thousand one and thirty-five hundredths (1001.35') feet to a point; thence
S 51° 19' 27" W	A distance of five hundred forty-nine and eight hundredths (549.08') feet to a point; thence
N 46° 32' 12" W	A distance of two hundred sixty-three and fifty-eight hundredths (263.58') feet to a point; thence
S 37° 45' 46" W	A distance of four hundred ninety-three and eleven hundredths (493.11') feet to a point; thence
N 26° 49' 02" W	A distance of three hundred eighty-one and sixty-six hundredths (381.66') feet to a point; thence
N 05° 28' 46" W	A distance of two hundred nine and seventy-six hundredths (209.76') feet to a point; thence
N 14° 16' 59" W	A distance of one hundred seventy and twenty-two hundredths (170.22') feet to a point; thence
N 41° 10' 05" W	A distance of one hundred forty-two and fourteen hundredths (142.14') feet to a point; thence
N 04° 17' 41" E	A distance of two hundred fifty-five and thirty-three hundredths (255.33') feet to a point; thence
N 16° 37' 40" E	A distance of three hundred fifty-five and eighty-six hundredths (355.86') feet to a point; thence
N 43° 15' 35" E	A distance of one hundred fourteen and ninety-seven hundredths (114.97') feet to the point of beginning

Said land is depicted as Solar Easement having an area of 420,341 more or less square feet (9.65 acres) on a plan entitled "44 Estabrook Avenue Exhibit Plan in Grafton, Massachusetts prepared for Knowlton Farms Nominee Trust" dated June 4, 2019, prepared by Meridian Associates, Inc.



Lease Area 2 Description:

Non-Exclusive Access Easement 43 Estabrook Avenue, Grafton Massachusetts

A certain parcel of land situated in the Town of Grafton on the northerly side of Estabrook Avenue, County of Worcester, and Commonwealth of Massachusetts is bounded and described as follows;

Commencing at a point along the northerly sideline of Estabrook Avenue, said point being four-hundred and forty five (445) feet, more or less, easterly of a drill hole in the stone wall face at the southwest corner of the said parcel at other land now or formerly Knowlton Farms Nominee Trust, as depicted on a plan filed as Plan Book 903, Plan 23 with the Recorded Land Division of the Worcester South District Registry of Deeds; thence running N 01° 41' 53" W a distance of forty and no hundredths (40.00') feet to a point; thence N 12° 09' 55" W a distance of sixty one and six hundredths (61.06') feet to the point of beginning; thence

N 12° 09' 55" W	A distance of one hundred forty-eight and eleven hundredths (148.11') feet to a point; thence
S 44° 42' 18" E	A distance of fifty and ten hundredths (50.10') feet to a point; thence
N 90° 00' 00" E	A distance of one hundred eighty and forty-five hundredths (180.45') feet to a point; thence
S 00° 00' 00" W	A distance of thirty-four and ninety-two hundredths (34.92') feet to a point; thence
N 90° 00' 00" W	A distance of twenty-one and five hundredths (21.05') feet to a point; thence
S 20° 08' 57" W	A distance of seventy-nine and ten hundredths (79.10') feet to a point; thence
N 90° 00' 00" W	A distance of one hundred thirty-six and eighteen hundredths (136.18') feet to the point of beginning

Said land is depicted as Non-Exclusive Access Easement having an area of 19,342 more or less square feet on a plan entitled "43 Estabrook Avenue Exhibit Plan in Grafton, Massachusetts prepared for Knowlton Farms Nominee Trust" dated June 5, 2019, prepared by Meridian Associates, Inc.

Lease Area
43 Estabrook Avenue, Grafton Massachusetts

A certain parcel of land situated in the Town of Grafton on the northerly side of Estabrook Avenue, County of Worcester, and Commonwealth of Massachusetts is bounded and described as follows;

Commencing at a point along the northerly sideline of Estabrook Avenue said point being four-hundred and forty five (445) feet more or less easterly of a drill hole in the stone wall face at the southwest corner of the said parcel at other land now or formerly Knowlton Farms Nominee Trust, as depicted on a plan filed as Plan Book 903, Plan 23 with the Recorded Land Division of the Worcester South District Registry of Deeds; thence running N 01° 41' 53" W a distance of forty and no hundredths (40.00') feet to a point; thence N 12° 09' 55" W a distance of two hundred nine and seventeen hundredths (209.17') feet to the point of beginning; thence

N 12° 09' 55" W	A distance of one hundred twenty-four and eighty-eight hundredths (124.88') feet to a point; thence
N 34° 25' 03" W	A distance of one hundred thirty-three and eighteen hundredths (133.18') feet to a point; thence
N 45° 03' 03" E	A distance of eighty-three and thirty-four hundredths (83.34') feet to a point; thence
S 44° 56' 57" E	A distance of one hundred forty-nine and twenty-seven hundredths (149.27') feet to a point; thence
N 90° 00' 00" E	A distance of four hundred and thirty hundredths (400.30') feet to a point; thence
S 03° 11' 21" E	A distance of two hundred fifty-six and nine hundredths (256.09') feet to a point; thence
N 90° 00' 00" W	A distance of two hundred sixty-one and seventy-one hundredths (261.71') feet to a point; thence
N 00° 00' 00" E	A distance of thirty-four and ninety-two hundredths (34.92') feet to a point; thence
S 90° 00' 00" W	A distance of one hundred eighty and forty-five hundredths (180.45') feet to a point; thence
N 44° 42' 18" W	A distance of fifty and ten hundredths (50.10') feet to the point of beginning

Said land is depicted as Lease Area having an area of 126,035 more or less square feet (2.89 acres) on a plan entitled "43 Estabrook Avenue Exhibit Plan in Grafton, Massachusetts prepared for Knowlton Farms Nominee Trust" dated June 5, 2019, prepared by Meridian Associates, Inc.

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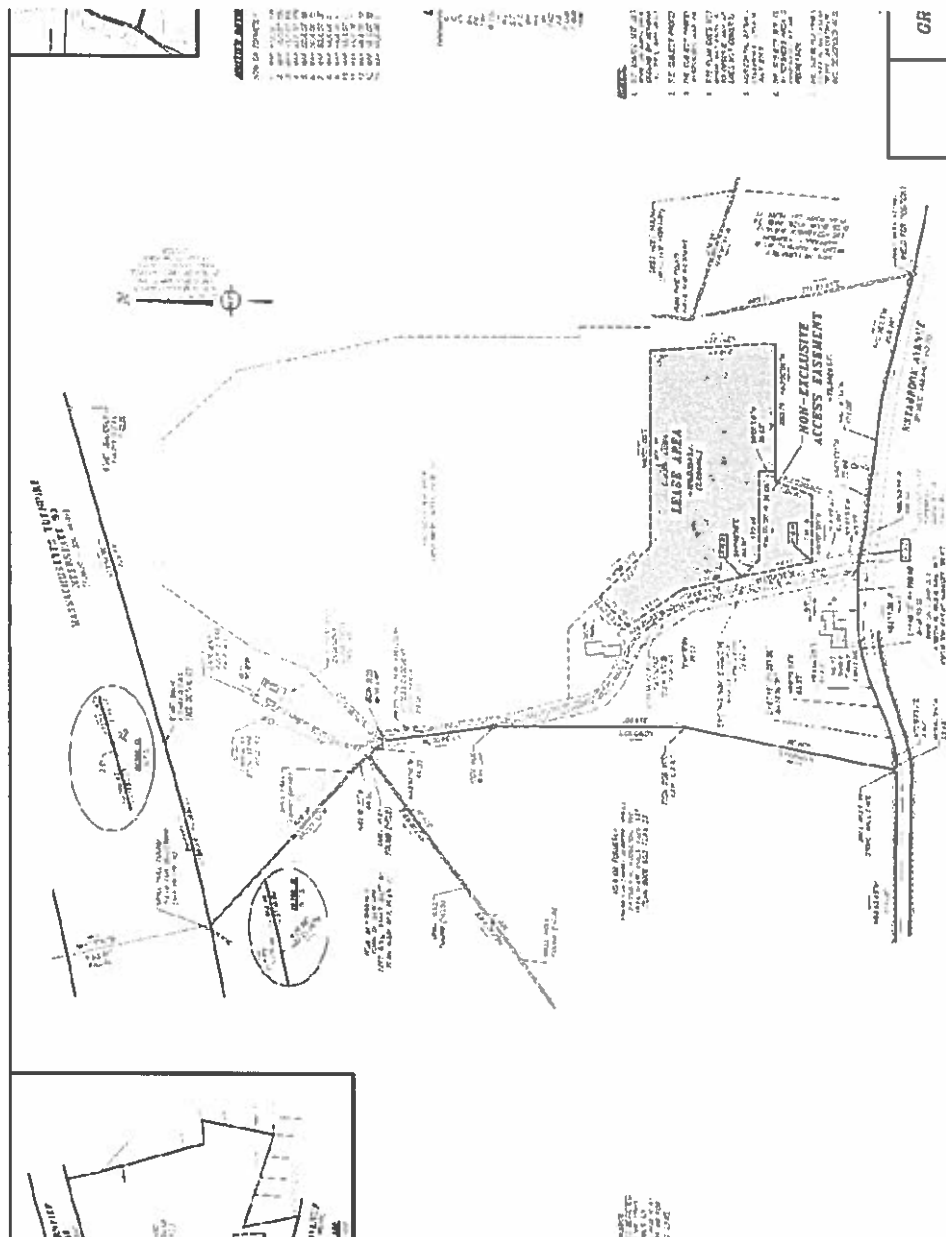


EXHIBIT B

Annual Payments

Year	Rate per MW AC	*Payment
2019	\$12,500	\$25,000
2020	\$12,500	\$25,000
2021	\$12,500	\$25,000
2022	\$12,500	\$25,000
2023	\$12,500	\$25,000
2024	\$12,500	\$25,000
2025	\$12,500	\$25,000
2026	\$12,500	\$25,000
2027	\$12,500	\$25,000
2028	\$12,500	\$25,000
2029	\$12,500	\$25,000
2030	\$12,500	\$25,000
2031	\$12,500	\$25,000
2032	\$12,500	\$25,000
2033	\$12,500	\$25,000
2034	\$12,500	\$25,000
2035	\$12,500	\$25,000
2036	\$12,500	\$25,000
2037	\$12,500	\$25,000
2038	\$12,500	\$25,000

* Payment based on a system size of 2.0 MW AC.

EXHIBIT C

Inventory for Lease Area 1, 44 Estabrook Avenue

One (1) 1,500kW, 2-hour battery storage (manufacturer TBD)
Three (3) SMA DPS-500kW, 1,000V DC/DC converters
One (1) SMA Sunny Central 2000 EV-US 1,760 kW AC inverter
13.8kV Yg 550VΔ pad mount three phase 2,200 kVA transformer with 5.75% impedance
Riser pole with 600A, 15kV Loadbreak switch
17 Ω neutral grounding reactor
7,098 modules (brand and spec TBD)

Inventory for Lease Area 2, 43 Estabrook Avenue

One (1) 1,500kW, 2-hour battery storage (manufacturer TBD)
Eight (8) SMA Sunny DC connection units, 1,000V with integrated disconnect switch
Eight (8) SMA Sunny Tripower 30000TL-US 30kW AC inverter
13.8kV Yg 480VΔ pad mount three phase 300 kVA transformer with 4% impedance
Riser pole with 600A, 15kV Loadbreak switch
118 Ω neutral grounding reactor
840 modules (brand and spec TBD)

4 (c) NEW BUSINESS: SPECIAL ELECTION for SELECT BOARD

Due to the recent resignation of Select Member Bruce Spinney, the board will need to consider and call a special election to fill the current vacancy.

MOTION:

I move the board vote to call a special election for the purpose of filling the Select Board seat vacated by Bruce Spinney.

7. DISCUSSION:

(a) Revenue and Expense Projections

(b) Long Term Tree Account